BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

REMARKS

Claims 1-11 are pending in the application. By this amendment claims 1, 6, 7, 10 and 11 are amended and claims 12-16 are added.

Telephone Interview

Applicants thank the Examiner for the telephone interview. With respect to the discussion regarding the term "tuck warp" and reference to pages of Warp Knitting Technology in the application, we attach the following documents:

- Warp Knitting Technology, pages 325-329 (Exhibit A);
- Textile Terms and Definitions for definitions of the terms, "fall plate fabric", "plating" (knitting), and "underlap" (Exhibit B).
- Comparison of knit fabric formed of knit structure containing tuck loops of tuck warp with the conventional knit fabric (Exhibit C);
- Knit sample of the present invention (Similar to Example 6) (Exhibit D); and
- Knit sample of comparative (Similar to Comparative Example 1) (Exhibit E).

By way of further explanation, the term "tuck warp" is the warp (warp yarn) for forming a tuck loop, and the term has nothing to do with the warp yarn for knitting a pillar stitch (i.e. chain stitch).

In Example 1 of the present invention (p.13, line 20 through p. 14, line 10), the knitted fabric has a knitted construction shown by FIG. 1 in which front guide (G_1) is threaded with tuck warps for forming tuck loops for interconnecting the neighboring wales formed by straight pillar stitches (i.e. straight chain stitches) knitted by the warp yarns carried by the middle bar (G_2).

In the knit construction of the knitted fabric of Example 1 of the present invention, the tuck yarns carried by front guide bar (G_1) form tuck loops by the fall plate action, while the warp yarns carried by the middle guide bar (G_2) knit the ground knit structure comprising straight chain stitches. In a case where the knitting should be carried out in the absence of action of the fall plate in Example 1, the warp yarns carried by front guide (G_1) must form knitted loops and cannot form any tuck loops. We believe the content of the attachments and these remarks clarify the specification.

Formalities

The specification has been amended to correct a typographical error. On page 9, line 22 **"tuck lap"** has been changed to **"tuck loop".**

Claim Rejections under 35 USC §102

Claims 1 and 3-11 are rejected under 35 USC §102(b) as being anticipated by Donaghy, et al. The rejection is respectfully traversed.

(1) Tuck Loops of Tuck Warp Engaged with Loops of a Ground Fabric Structure

Donaghy does not disclose a stretch fabric material comprising a knitted structure in which tuck loops of tuck warp are engaged with loops of a ground fabric structure.

The invention as claimed in amended claim 1 clearly defines a stretch fabric material composed of a Raschel warp knit fabric formed solely of a hard fiber yarn. The present stretch fabric material, although being formed solely of nonelastomeric fiber yarn, is exceedingly stretchable and has both stretchability and stiffness suitable especially for covering or bandaging a curved or irregularly-shaped body object or portion or human body. Accordingly, the present stretchable material exhibits gentle tightening force when being wound on an affected portion as a covering or a bandage.

The present stretch fabric material is unique for the reason as explained-above because the elongation of the fabric as high as 20% or greater is imparted by the presence of tucked loops of tuck warp yarns each engaging with the needle loops forming the ground knit structure.

The tuck loops are formed of warp yarn separate from that forming the loops of the ground fabric structure, and the tuck warp is additionally transferred to the back side of the needle stitches so as to be additionally engaged with the back side of the needle loops of the ground fabric structure so that the tuck loops do not cause any substantial restraining on the loops of the ground fabric structure (see the descriptions on lines 24 to 37 on page 4 of the specification). As a result, each tuck loop wraps with sinker loops in the adjacent knit loops (= loops of the present and previous courses) forming the ground fabric structure, thereby the tuck loops keeping the ground fabric structure in a loosened or slackened state.

Fig. 5 illustrates examples of tuck loops 3a, 3b, 3c and 3d engaging chain stitch loops (2) forming a ground fabric structure (see the description on page 4, line 37 to page 5, line 14

Fig. 2 shows a three dimensional view of a fabric obtained according to present Example 4, in which the respective tuck warps (1) forming tuck loops (3) engages with the respective sinker loops of the needle loops of the ground fabric structure of the chain stitch (2) so that each tuck loop wraps loosely or in a slackened manner, each sinker loop (loops connecting two adjacent needle loops of the loop forming the ground fabric structure. In Example 4, tuck loops are formed by means of fall-plate in a lapping movement of the dembigh connecting ground fabric structure of chain stitch (See the description in line 31 on page 15 to line 17 on page 16).

Since the tuck warp is knit into an easily movable structure in which the tuck warp loosely wraps an engaging portion of a sinker loop of a knitted loop forming of the ground fabric structure, a chain stitch, the knit fabric exhibits the elastic recovery of elongation when the stretched tuck loop shrinks to the original tuck loop.

(1) As the tuck loops are additionally attached to the ground knit structure they do not tightly enwrap the sinker loops of the knitted loop forming the ground fabric structure, but a sinker loop of the loops forming the ground fabric structure appears on the back side in a floating manner and is engaged with the loops of the ground fabric structure solely at a position transferring to the needle by the overlap at right and left ends, thereby a Raschel knit fabric exhibiting elastic properties is formed. According to the present invention, when the fabric is stretched by the deformation of the tuck loop of the tuck warp in the knit structure forming the fabric, a stretch back property is easily exhibited (See the description line 3 on page 10 through line 10 on page 11).

Donaghy et al. (hereinafter referred to as Donaghy) describes a three-bar Raschel warp knitted fabric which can be molded by heat setting, so as to be suitable for use in making breast cups for women's brassieres.

The Raschel warp knitted fabric has a three-bar Raschel construction including a set of elastic yarns inlaid with satin-effect yarns and a specifically selected ground yarns, and basically comprises a first set of yarns warp knitted in course wise extending underlaps at the technical back of the fabric to provide a satin-like effect, interknitted with a set

of ground yarns warp knitted in a stitch pattern forming a stabilized fabric ground structure (See the descriptions in lines 10 to 12 at column 2; and lines 59 to 64 at column 1).

According to the descriptions of Donaghy referring to Fig. 2, the warp knitted fabric is embodied by a knitted construction in which the first set of yarns (=satin effect yarns 24 threaded on the top guide bar in a repeating 4-6, 2-0 stitch pattern, III) are interknitted with a set of ground yarns (ground yarns 22, the middle guide bar in a repeating 2-0, 2-4 stitch pattern, II) with each satin-effect yarn 24 being formed in needle loops 24n alternating every course C between wales W spaced apart by one intervening wale W, satin needle loops 24n being interknitted in plated relationship with the needle loops 22n of the ground yarns 22 in the respective wale W (see column 5, lines 28 to 23, and 50 to 61), thereby ground yarns 22 form an essentially stabilized base of ground structure and the satin effect yarns 24 outwardly of the ground yarns 22 at the technical back of the fabric to present a satin-like fabric surface (See the description in line 62 at column 5 through line 2 at column 6).

Based on the embodiment of Donaghy as referenced above, the first set of yarns (the satin effect yarns threaded in the top guide bar, III) are interknitted with a set of ground yarns (middle guide bar, II) so that the satin needle loops 24n of warp are interknitted in plated relationship (formed in the same needle stitch) with the needle loops 22n in the respective the satin-effect needle loops 24, thereby the satin needle loops 24 formed of the first set of yarn being engaged with the ground structure at the ground needle loops 22n knitted in the same needle stitch.

Because the satin needle loops 24 cannot be tuck loops, no engagement of tuck loop with the ground fabric structure is contained in the warp knitted fabric of Donaghy. Since the warp knitted fabric structure of Donaghy has a ground fabric structure stabilized by satin effect warp yarns engaged with needle loop, the front guide bar for knitting satin effect yarns cannot be equipped with means for forming tuck loop of the warp yarn, for example, fall-plate. Accordingly, the satin effect yarns 24 cannot be tuck warps for forming tuck loop. For the reason set forth above, the warp yarns in the first guide bar cannot be tuck warp which is additionally transferred to the back side of the stitches to be engaged with the back side of the loops of the ground fabric structure. Accordingly, Donaghy does not disclose tuck warp loops

engaged with ground fabric structure loops as is claimed by Applicant in claims 1, 6, 7, 10 and 11.

The moldable warp knitted fabric of Donaghy is an essentially stabilized base of ground structure with the technical back of the fabric to present a satin like fabric surface, settable into permanent shape conforming to a three dimensional mold as breast cup mold without distension of the knit structure. Accordingly, the Raschel warp fabric intended in Donaghy cannot have any structure capable of elongate as great as 20% in the warp direction as is claimed by Applicants in claims 1, 6, 7, 10 and 11. Additionally, rejected claims 3-5 and 8 and 9 depend on the aforementioned independent claims, they too are not anticipated by Donaghy.

Therefore, Donaghy does not teach the presently claimed warp knitted fabric in which the loop of tuck warp yarn is additional transferred to the back side of the stitches to be additionally engaged with the back side or the loops of the ground fabric structure so that it does not cause restraint on the lap of the ground fabric. Withdrawal of the 35 USC §102(b) rejection is respectfully requested.

(2) Hard Fiber Yarn

Dependent claims 1, 6, 7, 10 and 11 have been amended to include a **"hard fiber yarn"**, support for which is found on page 6, line 37 through page 7, in line 7 of the specification. A hard fiber yarn is not disclosed by Donaghy. In fact, Donaghy teaches away from using a hard fiber yarn. Donaghy teaches use of elastic yarns (reference numeral 20, see col. 4, line 5) "that predominantly serve the function of contracting the knitted structure of the fabric (col. 4, lines 35-37). As Donaghy teaches away from the hard fibers claimed by Applicants, it cannot be considered to anticipate Applicants' claimed invention.

(3) Load of 300g/10 cm

Claims 1, 13-16 have been added, which include the 20% elongation to be **"under a load of 300g/10 cm."** Support for these claims can be found in the description on page 5, line 31

through page 6, line 8. Donaghy does not disclose such a load, and therefore, Applicants' claimed invention is further differentiated from Donaghy, and not anticipated by the reference

Rejection under §35 USC 103

Claim 2 is rejected under §35 USC 103(a) as being unpatentable over Donaghy, *et al.* This rejection is respectfully traversed.

The specific ground fabric stitches as recited in claim 2 are additional conditions, but not essential condition for attaining the present stretchable fabric. Any kind of ground fabric structures may be used for the purpose of optimization of secondary characteristics such as strength, softness, but these characteristics are additional ones.

The present stretchable fabric must have an elongation of at least 20% in the warp direction. The function of this high elongation is imparted by the presence of tuck loops of tuck warp yarn (warp yarns threaded in the front guide bar) in the fabric knit structure. It is, therefore, crucial that the present stretchable fabric contains tuck loops of tuck warps in fabric knit structure.

Since the tuck warp is knitted in a easily movable structure in which a tuck warp loosely wraps an engaging portion of the sinker loop with a needle loop so the ground fabric structure such as a chain stitch (plain stitch), a dembigh stitch or a queen's cord stitch, the knit fabric exhibits the elastic recovery of elongation when the stretched tuck warp shrinks to the original tuck loop (See the description in line 23 on page 10 through lines 2, on page 11).

As previously discussed, the three-bar warp knitted fabric of Donaghy has a knitted construction comprising the first set (threaded in the front guide bar) of warp yarns forming the satin needle loops 24 engaged with the ground structure at the ground needle loops 22n knitted in the same needle stitch so that the stitch construction of both the ground and satin-effect yarns 22 and 24 to compact their needle loops 22n, 24n to enhance the satin-like appearance of the yarns 24 at the technical back of the fabric. It is apparent that the warp fabric of Donaghy cannot contain any tuck loop of the satin effect warp yarns engaged with the ground fabric structure, and cannot produce highly elongatable fabric from non-elastic yarn.

Based on the foregoing discussion, the stretch fabric material composed of a Raschel warp knit fabric of present claim 2 would not have been obvious over the warp knit fabric of

Donaghy because the stretchable warp knit fabric containing tuck loops of tuck warps engaged with the ground fabric structure is not suggested in Donaghy. The invention of present claim 2 would not be predicted from the specific stitch of ground fabric structure described in Donaghy because the presently claimed knit structure containing tucked loops of tuck warp yarns, each engaging with the needle loops forming the ground knit structure, could not be motivated by the knit construction of moldable warp knitted fabric described in Donaghy.

New Claim 12

As new claim 12 depends on claim 1 as amended, it too overcomes Donaghy, *et al.* The basis of new claim 12 is found in the description "The inorganic fiber used in the present invention typically includes glass fiber now on the market. ... The organic fiber used in the present invention typically includes natural fibers . . . ; . . . ; synthetic fibers such as polyamide fiber, polyester fiber . . . all of which are ordinary yarns (not being textured to have crimps or the like for the purpose of obtaining the stretchability)." in lines 7 to 19 on page 7 of the present specification.

For the aforementioned reasons it is respectfully requested that a notice of allowance be issued for claims 1-16.

Respectfully submitted,
SCHNADER HARRISON SEGAL & LEWIS LLP

Dated: 4/19/04 By: Joan T. Kluger

Joan T. Kluger
Registration No.: 38,940
Direct Dial: 215-751-2357
Fax: 215-751-2205
e-mail: jkluger@schnader.com
1600 Market Street, Suite 3600
Philadelphia, PA 19103
Attorneys for Applicants

WARP KNITTING TECHNOLOGY

D. F. PALING, F.T.I.

COLUMBINE PRESS

EXHIBIT A

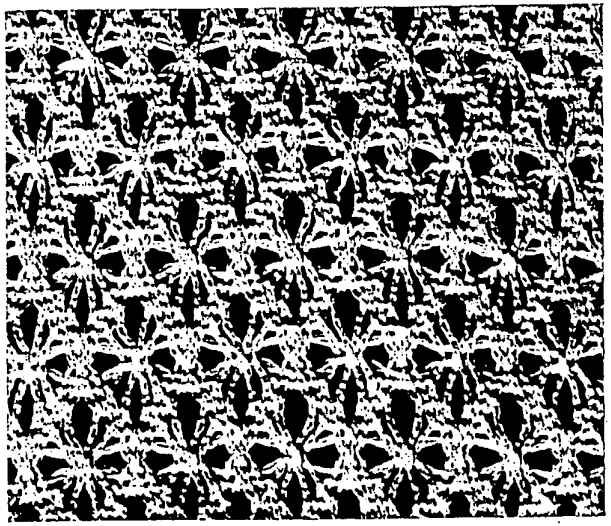


FIG. 242. HEAVY NET USED AS SHOE FABRICS

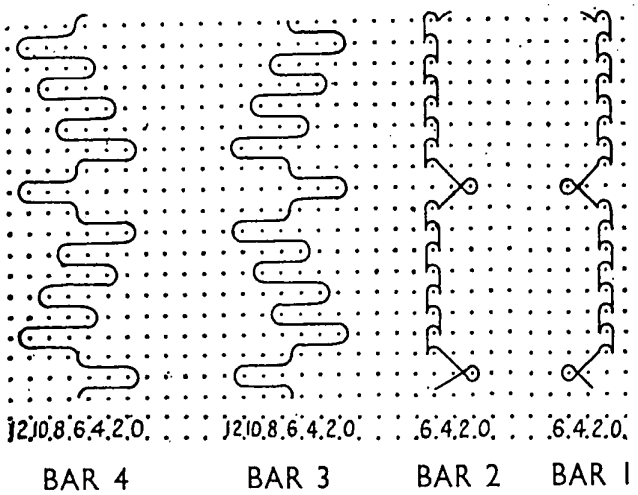


FIG. 243. LAPPING MOVEMENTS FOR THE SHOE FABRIC ILLUSTRATED IN FIG. 242

The two front guide bars produce chaining laps for eight consecutive courses, but the movement is varied on every ninth course so that the wales are interconnected at these points in groups of four. The diamond effect is largely dependent upon the distortion created by the laying-in threads which pull the wales of chained loops out of their vertical positions to give the required effect. The preparation of the warps for this particular fabric is greatly simplified by threading the guide bars in a manner which requires exactly the same number of threads in each warp. This is possible since the laying-in bars require heavier yarns to give the desired effect and, by passing four ends through each threaded guide, the total number of ends in each warp becomes exactly the same.

The number of ends in each warp is therefore equal to half the number of needles in use. Since the lapping movements of the two knitting bars are similar but in opposition, as also are the movements of the laying-in bars, it would in fact be possible to produce the fabric from two full-set warps by splitting the ends from the front beam between the two front guide bars, and the ends from the back beam between the two back guide bars.

The pattern chain construction for each of the guide bars is as follows:

Guide Bar 4 (Back)	:	0-0/6-6/12-12/4-4/10-10/2-2/8-8/0-0/6-6/ 12-12/6-6/0-0/8-8/2-2/10-10/4-4/12-12/6-6
Guide Bar 3	:	12-12/6-6/0-0/8-8/2-2/10-10/4-4/12-12/6-6 0-0/6-6/12-12/4-4/10-10/2-2/8-8/0-0/6-6
Guide Bar 2	:	2-0/4-6/6-4/4-6/6-4/4-6/6-4/4-6/6-4 and repeat.
Guide Bar 1 (Front):		4-6/2-0/0-2/2-0/0-2/2-0/0-2/2-0/0-2 and repeat.

Fall-plate Fabrics

Most Raschel warp knitting machines of the old type are provided with a fall-plate mechanism which can be used when working with a single needle bed and at least two guide bars. The fall-plate, which is a thin metal blade extending across the full width of the needle bar, is mounted centrally between the guide bars as shown in Fig. 244. It is attached to the guide bar assembly and makes the same swing motion as the guide bars, but it also has an independent vertical motion which is derived from a double-nosed cam on the main camshaft.

The movement imparted to the cam-follower is transferred to the fall-plate by connecting arms and levers, and the operation of the mechanism is such that the fall-plate is depressed to the position shown in Fig. 244*b* once during each course. The movement of the fall-plate is timed to take place when the needle bar is at the top of its stroke but after the lapping movements are completed, and the downward move/

ment of the fall-plate is made before the needle bar begins to descend. During the descent of the needle bar the fall-plate is raised to its original position.

At each course all the needles in the knitting width receive one or more threads which are to be formed into loops and which produce the ground or basic structure of the fabric. These threads are supplied by a guide bar or guide bars to the rear of the fall-plate. In addition,

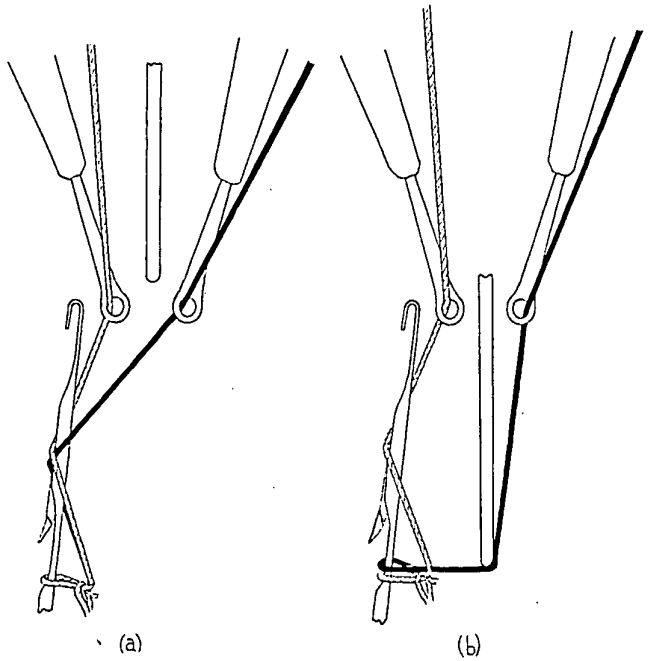


FIG. 244. PRINCIPLE AND OPERATION OF THE FALL-PLATE

certain needles receive other yarns which are not formed into loops and which may be either ornamental or an essential part of the fabric structure. These threads are supplied by guide bars situated in front of the fall-plate.

During the knitting cycle and at a time when the lapping movements are completed, the warp threads of the various guide bars will be left wrapped around the needle stems and on top of the latches as shown in Fig. 244*a*. At this moment the fall-plate is lowered to the position shown in Fig. 244*b*, and in its downward movement it depresses all the warp threads supplied by the front guide bars. The action of the fall-plate is therefore to carry below the level of the latches all the yarns from guide bars situated at the front of the machine. (The threads supplied by

guide bars situated to the rear of the fall-plate will not be affected by this operation). The pattern yarns are therefore pushed down the needle stems until they are in contact with the fabric loops, and, as the needle bar descends, the warp threads of the ground bar are retained inside the needle hooks and form the new fabric loops, but the pattern yarns which were depressed by the fall-plate are knocked over with the old fabric loops. The fall-plate yarns are connected to the ground structure and lie on the reverse side of the fabric, which is used as the effect side.

The construction of a simple fall-plate fabric, together with the lapping movements used in its production, are shown in Fig. 245. The back guide bar which is fully threaded makes a simple chaining movement and, if working alone, would produce unconnected wales

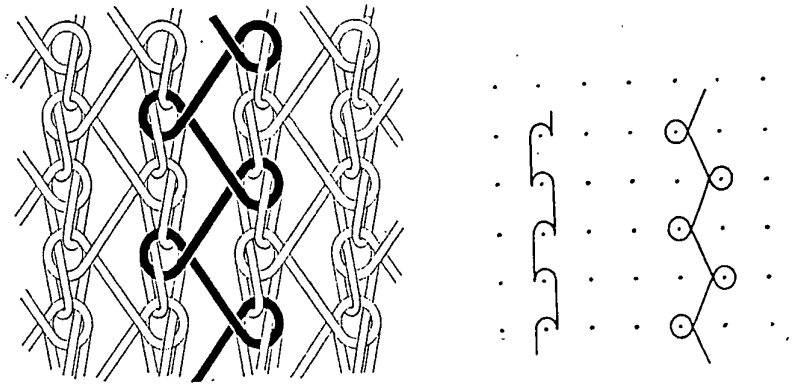


FIG. 245. CONSTRUCTION OF A FALL-PLATE FABRIC AND THE APPROPRIATE LAPPING MOVEMENTS

across the whole of the needle bar. The interconnecting of the wales is given by the fall-plate yarns which are carried in the front guide bar and are given a simple 1 and 1 lapping motion. One of the fall-plate threads is shown in black so that its path may be more readily followed.

It will be seen that there is a certain similarity between fall-plate laps and laid-in laps, the effect threads in both being interlaced with underlaps of the ground structure. There are, however, several important differences which may be classified as follows. First, in fall-plate fabrics the effect threads are carried in the front guide bars whereas in laid-in fabrics the effect threads must always be carried in guide bars to the rear of the ground threads. Secondly, in the production of fall-plate fabrics the effect threads are given both underlaps and overlaps, whereas the effect threads of laid-in fabrics make underlaps only. Thirdly, when closed laps are used (and when open laps are used under suitable conditions), the fall-plate yarns are given a half-twist at each

point of connection with the ground structure. This feature is not apparent in laid-in fabrics.

Since the fall-plate yarns are never knitted into the fabric, and do not enter the needle hooks, it is possible to use very heavy counts of yarn to give prominence to the design.

The bars carrying the fall-plate yarns should make their overlaps

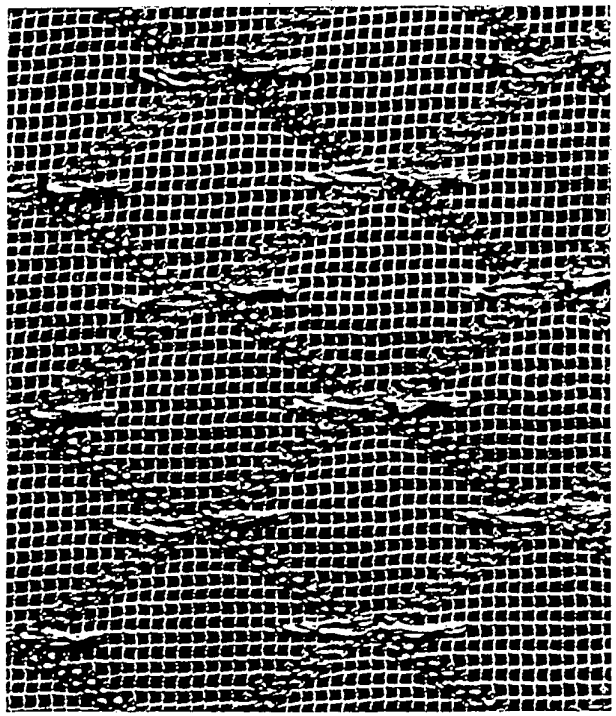


FIG. 246. FALL-PLATE LAPS ON A MARQUISETTE NET GROUND

in the opposite direction from the bar carrying the ground threads. This is desirable because similar overlaps will cause the warp threads to lie parallel and close together on the needle stems. In this position slight changes in tension may cause the yarns to reverse their positions, and the action of the fall-plate will then cause both the ground and pattern yarns to be depressed below the latches with resulting dropped stitches. If the overlaps are made in opposite directions, the threads are crossed on the needle stems and the area of contact between them is small, thus allowing the fall-plate yarns to be lowered without interfering with the ground threads.

From examination of the structure shown in Fig. 245 it would appear that the ground threads and fall-plate yarns are passing around the needle in the same direction. It should be remembered however, that the fall-plate yarn is knocked over with the previous course and

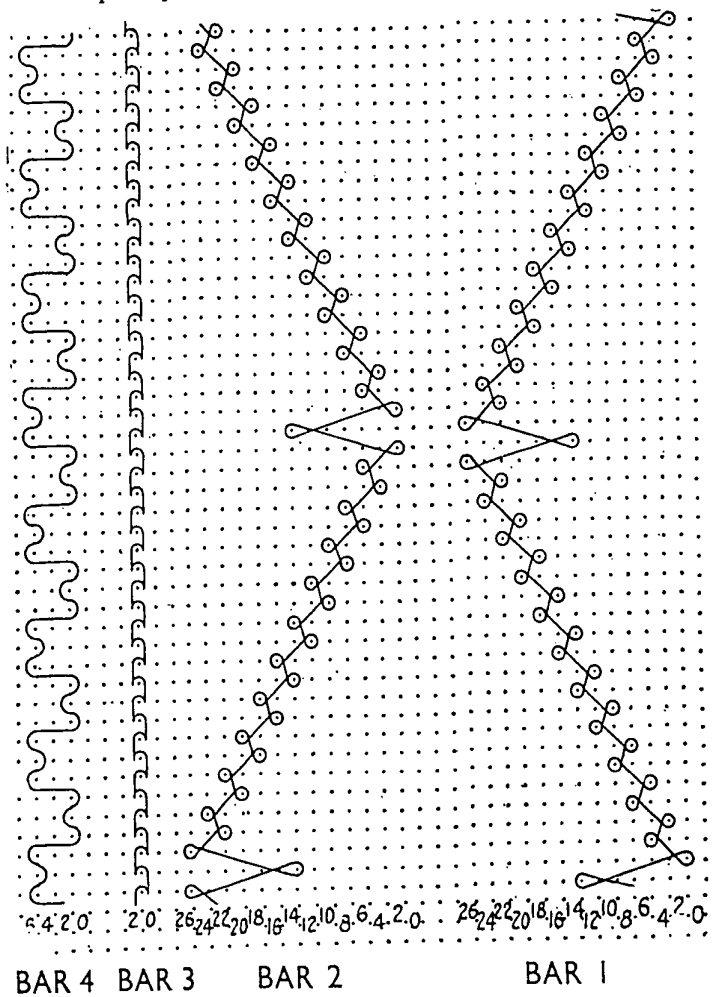


FIG. 247. LAPPING MOVEMENTS FOR THE NET SHOWN IN FIG. 246

takes up a position in the fabric which is one course lower than the ground thread with which it was overlapped.

When fall-plate laps are used in conjunction with a chaining movement of the back guide bar, the threading of the fall-plate yarns must

Textile Terms and Definitions

Seventh Edition

Compiled by
THE TEXTILE TERMS AND DEFINITIONS COMMITTEE

Edited by
CAROLYN A. FARNFIELD, BSc, MSc, AIInfSc
P. J. ALVEY, BSc, PhD

Manchester
The Textile Institute
1975

face-finished (fabric)
adj. Descriptive of a finish given, for example, to wool cloths, in which the face side is treated selectively, as in raising.

*face-to-face carpets
n. Carpets made in pairs face-to-face with the pile yarns interchanging from one substrate to the other. The pile yarns are severed to separate the two fabrics.

facing silk
n. A fine lustrous fabric of silk (usually of corded satin, twill weave, or barathea) used for facing, e.g., lapels in men's evening wear. (Fabrics of other fibres are used for facing purposes but should not be described as 'facing silk'.)

façonné; faconne
n. or *adj.* The French word for figured. It is used in relation to textiles to describe jacquard fabrics with a pattern of small scattered figures.

*faille
n. A fine, soft fabric, woven from continuous-filament yarn, made in a plain weave with weft-way ribs formed by the intersection of fine, close-set warp with a coarser weft. It was originally made of silk with a warp of the order of 45 denier and a coarser weft of about 117 denier.
Note: Faille belongs to a group of fabrics having ribs in the weft direction. Examples of this group arranged in ascending order of prominence of the rib are taffeta, poult, faille, and grosgrain.

faille ribbon
n. See under *ribbon.*

failletine ribbon
n. See under *ribbon.*

*fall plate fabric, warp-knitted
n. A fabric made on a *raschel warp-knitting machine* (q.v.), using one needle bar, involving the use of a solid metal plate *(fall plate* or *chopper bar)* to push down the newly formed laps below the spoons of the open latches, to be cast off with the ground laps of the previous course.
The fall-plate yarns are connected to the ground by passing under the underlaps of the ground construction at the extremity of their movement only, and lie on the top of the technical back of the fabric between these points.

fallers
n. (1) Straight, pinned, metal bars employed in the control of fibres between drafting rollers.
(2) Curved, pinned, metal bars employed in the feed mechanism of Lister and square-motion (Holden) combs.
(3) Curved arms fixed to two shafts on a mule carriage and carrying the faller wires (see *counter fallers* and *winding fallers*).

*false twist
n. Turns inserted in opposite directions and in equal numbers in adjacent elements of yarn, sliver, or similar aggregations of fibres or filaments, characterized by their temporary nature.
Note 1: The extreme ends of the yarn or sliver are prevented from rotating, and the false-twisting element, through which the yarn or sliver passes, is situated between these ends.
Note 2: At the start of the operation, turns of twist are inserted by the revolution of the twisting element (one turn in each direction on either side of the twisting element) but, as the yarn or sliver passes through the twisting element, each turn of twist carried through from one side cancels a turn present on the other side.
Note 3: The amount of twist actually inserted depends not only on the relative speeds of the twisting element (rev/min) and yarn or sliver (m/s), but also on the effectiveness of the means adopted in the twisting element to resist rotation, and on the restoring torque exerted by the twisted yarn or sliver.
Note 4: False twist may be used :
(i) to produce effects, e.g., *(a)* the entanglement of fibres while false-twisted, *(b)* a measure of permanence to the twisted form, by heat-setting the false-twisted yarns;
(ii) to assist processing, e.g., *(a)* the passage of sliver from Noble comb to can, *(b)* the attenuation of rovings on a condenser ringframe.

fancy yarn
n. A yarn that differs from the normal construction of single and folded yarns, by way

plain net
n. A twist lace fabric made with an equal number of warp and bobbin threads. The warp threads run lengthwise in the fabric. The bobbin threads twist round the warp threads and traverse diagonally in the fabric. Equal numbers of bobbin threads are always traversing in opposite directions. A fine net made of silk is sometimes described as *tulle* (q.v.).

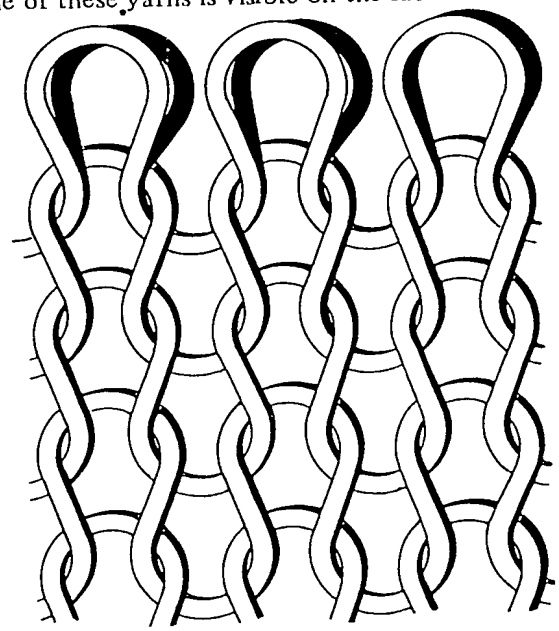
plain net machine
n. See under *lace machines.*

plaiting
n. See *braiding*.

plaits
n. The products of the *braiding* (q.v.) process, e.g., mending plaits.

plastics laminate
n. A hard board or sheet formed of one or more layers of textile fabric, impregnated with synthetic resin and compressed.

plating (knitting)
n. The controlled knitting of two similar loops within the same stitch such that each yarn takes up a definite position within the stitch. (Plating usually involves the knitting of two yarns of different colour, different lustre, or different composition, so that only one of these yarns is visible on the face of the stitch.)



Plain plated knitted fabric

***pleated fabric, warp-knitted**
n. A fabric produced from two or three guide bars in which the front warp is stopped while the front bar mis-laps. The fabric produced by the back bar (or back and middle bars) while the front bar mis-laps is raised out of the plane of the fabric in the form of a pleat extending across the complete width of the fabric. All bars are full-set threaded.

***plied yarn**
n. An alternative to the term *folded yarn* (q.v.).

plissé
adj. A French term meaning pleated that is applied to fabrics with a puckered or crinkled effect (cf. *seersucker*).

pluckings
n. The short, clean fibre produced at the end of the scutching machine where the operatives dress and square the pieces of flax ready for selection. In grading, pluckings are classed as *tow* (q.v.).

underfelt (carpeting)
n. A felt used as an *underlay* (q.v.).

*underlap; shog (warp knitting)
n. (1) Lateral movements of the guide bar made on the side of the needle remote from the hook or beard; the amount of this movement is limited only by mechanical considerations.
The terms *lap, shog, throw, rise,* and *fall* are also used to express general lateral motions of the guide bars without specific reference as to whether they are made in front of or behind the needles.
(2) In the fabric, the connexion between stitches in consecutive courses in a warp-knitted fabric.

underlay
n. Any material that is placed beneath a carpet to enhance its physical performance, e.g., resilience, durability.

undrawn yarn (fibre)
n. Extruded yarn (fibre), the component molecules of which are substantially unoriented and which exhibits predominantly plastic flow in the initial stages of stretching.
Note: Undrawn yarn represents an intermediate stage in the production of a man-made-fibre yarn.

union cloth
n. A cloth made with warp of one kind of fibre and weft of another.
Note: Originally the term related to cloths made from cotton warp and wool weft or from linen warp and cotton weft.

†union dye
n. A dye or mixture of dyes designed to yield a uniform dyeing on the fibre mixture for which it is devised.

unripe cotton
n. See *immature cotton.*

untwisted
adj. Descriptive of a strand of fibres or filaments from which part or all of the twist has been removed. The term is also used to describe a plied yarn from which plying twist has been removed.

unweaving
n. The act of removing weft threads incorrectly inserted during weaving *(picking-out)* and the subsequent re-setting of the fell of the cloth to the correct position *(pulling-back)* before the loom is restarted.
Note: The terms *pulling-back* and *picking-out* may also be used to describe the whole operation.

upholstery cord
n. A cord consisting of two case cords and two gimp cords, all of which have been over-twisted, the four strands then being twisted together in the reverse direction.

upholstery web
n. See *chair web.*

Utrecht velvet
n. See under *velvet.*

Vandyke braid
n. See *ric-rac braid.*

vat
n. (1) A vessel in which vat dyeing is carried out. Alternatively, a large vessel for holding dye, bleach, acid, tanning, or other liquors.
(2) A dye liquor containing a leuco vat dye, together with the necessary alkali and reducing agent.

vat
v. To bring a vat dye into solution by the combined action of alkali and a reducing agent.

*†vat dye
n. A water-insoluble dye, usually containing keto groups, which is normally applied to the fibre from an alkaline aqueous solution of a reduced enol (leuco) form, which is subsequently oxidized in the fibre to the insoluble form.

veiling (lace)
n. Plain or ornamental nets, with relatively large meshes, used mainly for face veils or hat decoration.

velour
n. A heavy, pile fabric with the pile laid in one direction.

Comparison of knit fabric formed of knit structure containing tuck loops of tuck warp with conventional knit fabric

(1) Tuck loops containing knit structure vs. conventional knit structure

Figure A represents knit structure (construction) of the knit fabric described in Example 4 of the present specification in which loops of tuck warp yarns are formed by lapping movements in repeating dembigh pattern to engage the loops of ground fabric structure in a manner the tuck loop wraps the sinker loops of the adjacent chain stitched knit loops forming the ground fabric structure, thereby the chains stitches forming the respective neighboring wales are connected together.

While the needle loop is formed on a knitting needle in a chain stitch pattern for knitting the ground fabric structure, the tuck loop (loop portion) is simultaneously formed on the same needle in the dembigh pattern so as to be engaged with the ground fabric structure by wrapping the sinker loops of the two adjacent knitted loops forming the ground fabric structure.

Figure C illustrates a the knitted fabric structure containing no tuck loop of tuck warp (conventional knitted fabric). The knitted fabric is knitted by two-bar warp knitting machine. While the warp yarns carried by the back-guide bar (G_2) knit the ground fabric structure in a chains stitch pattern, the warp yarns carried by the front guide bar (G_1) knit the effect yarn in a dembigh stitch pattern on the same needle with no fall-plate provided. Accordingly, the dembigh knitted warp yarns cannot form tuck loops. For this reason, the dembigh stitching warp yarns are solely interknitted with one another and with the chain stitched

ground warp yarns with each dembigh stitched loops being interlocked in a plated relationship with the needle loops forming the ground fabric structure as shown in Figure C. Accordingly the dembigh stitched loops and chain stitch loops forming ground fabric structure are tightly engaged in the knit structure to form a firming rigid knit fabric.

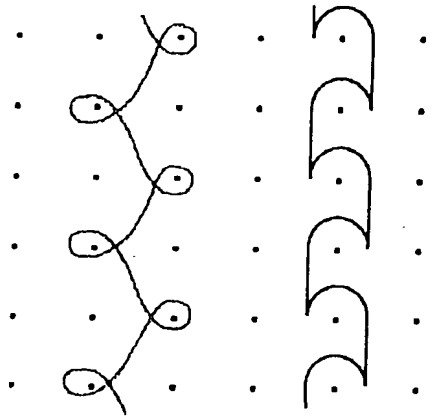
(2) Function of the presence of tuck loops in knit structure

Since the tuck loops cannot be ~~not~~ engaged with any needle loops in the ground fabric structure, the tuck loops in the knit structure neither restrict any deformation of the loop forming the ground fabric structure nor be hindered of its self-deformation. Since the tuck loop can be elastically deformed, the presence of tuck loops in knit fabric structure makes a fabric quickly recoverable from deformation such as elongation. Figure B schematically explains the characteristic elastic recovery of tuck loop from deformation. When a knit fabric containing tuck loops is elongated, tuck loops formed of tuck warp are readily deformed into smaller loops, thereby each sinker loop intervening adjacent tuck loops is temporarily lengthened causing the knitted fabric to be elongated with elastic recovery from the deformed tuck loop (a) imparted by the recovery force (f) of the deformed tuck loop provided by the elastically lengthened sinker loop intervening between the respective adjacent tuck loop engaged at the sinker loops of the ground fabric structure.

(Concluded)

Attachment: Figures A, B and C

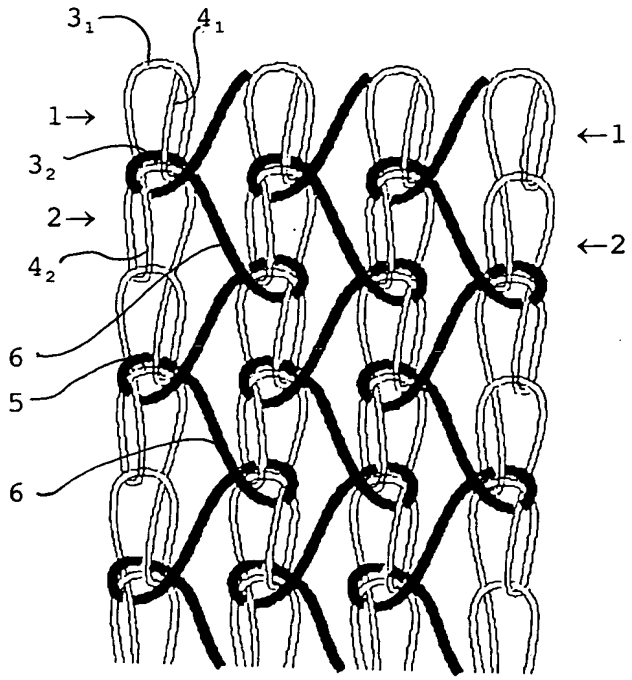
Figure A Knit fabric formed of two-bar knit structure containing tuck loop of tuck warp



G_1 G_2

(Front bar) (Back bar)

Lapping movements



Three-dimensional knit construction diagram

Note:

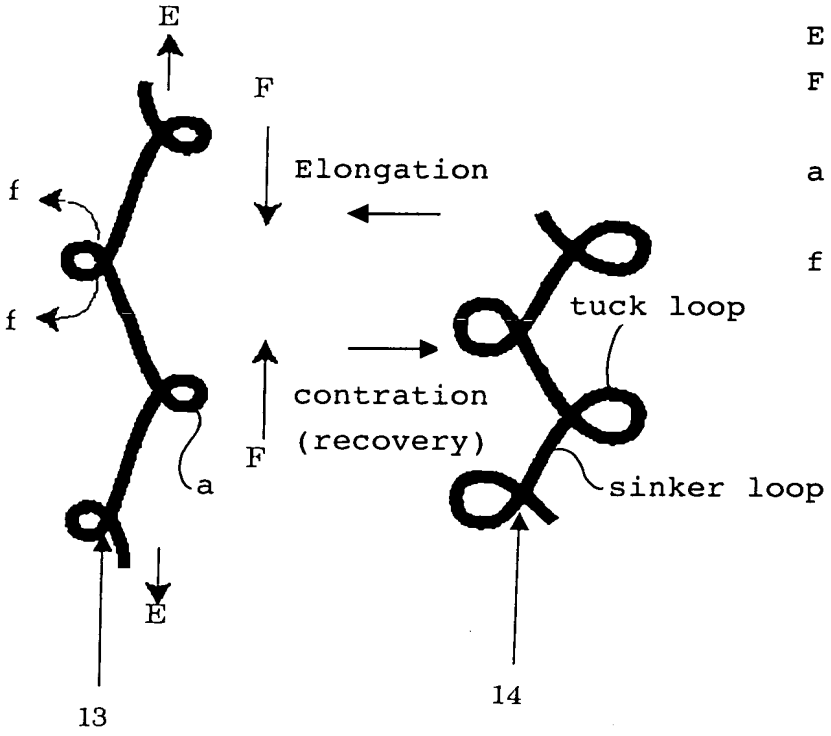
Definitions

1) A "needle loop" is a loop yarn drawn through a previously made stitch.

2) A "sinker loop" is the yarn connecting two adjacent needle stitch.

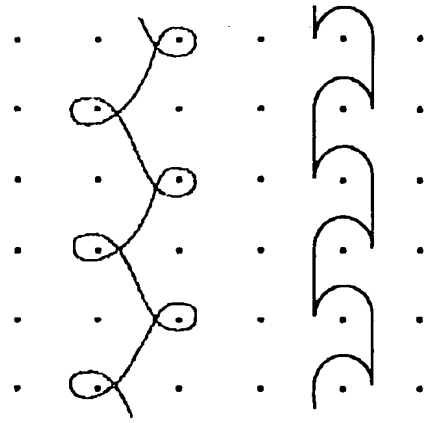
1. Present course
2. Previous course
3. 3_1. Needle loop in the present course
4. 3_2. Needle loop in the previous course
5. 4_1. Sinker loop in the present course
6. 4_2. Sinker loop in the previous course
5. Tuck loop of tuck warp
6. Sinker loop of tuck warp

Figure B Elongation and elastic recovery function attained by the presence of tuck loops in knit fabric structure

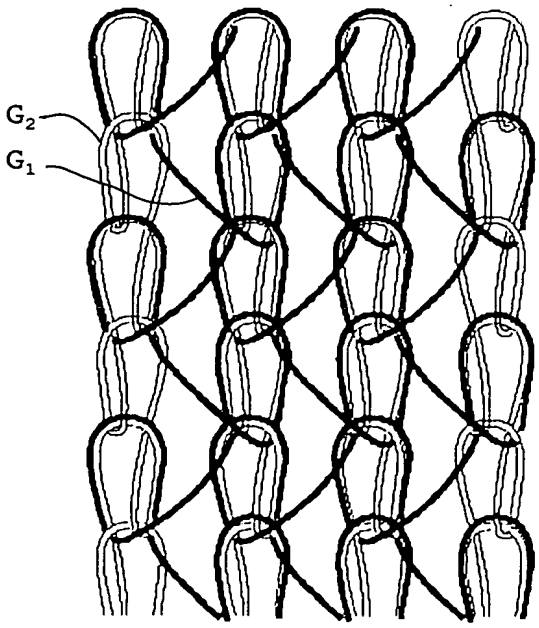


E: Elongation force
F: Contractive force (Recovery force)
a: Deformed tuck loop
f: Recovery force of the deformed tuck loop

Figure C Knitted fabric formed of conventinal two-bar knit structure with no tuck loop of tuck warp



G_1 G_2
(Front bar) (Back bar)
Lapping movements



Three-dimensional knit construction diagram

Dembigh stitched warp yarns (G_1) are interlocked with the chain stitched warp yarns (G_2) in plated related relationship, thereby the knit fabric structure being firmed rigidly.

Knit sample of the present invention (Similar to Example 6)

A Raschel warp knit fabric was knit by using a single Raschel warp knitting machine (9 gauge) having three guide bars (G1, G2 and G3) with a fall-plate under the following knitting conditions. The lapping movements of the guide bars during the knitting operation are shown in Fig. 1.

Guide bars	Threading	Chain link	Kind/Number of ends threaded
G1 (front guide bar full-set for tuck warp in front of fall-plate)		12/10	P-mono (222.2 dtex)
G2 (middle guide bar full-set for ground structure)		10/01.	F-multi (277.8 dtex/24f)/2
G3 (back guide bar full-set for inlaid yarn)		00/33	P-multi (277.8 dtex/48f)/1

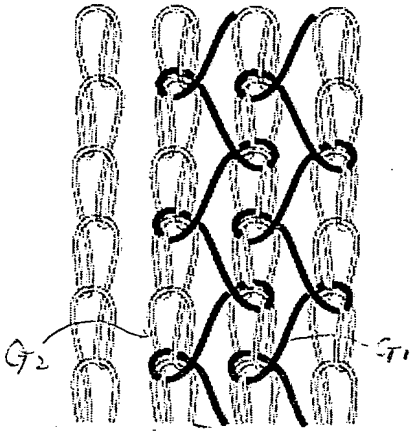
The resultant grey fabric was heat-treated through a boiling water (at 100C) at a tension of 20g/10 cm width for about 5 seconds, dehydrated and dried. Physical properties of the finished fabric are as follows:

Basis of weight	255 g/m^2
Course density	21 courses/2.54 cm
Wale density	10.7 wales/2.54 cm
Elongation	51.7%
Elastic recovery	96.8%

EXHIBIT D

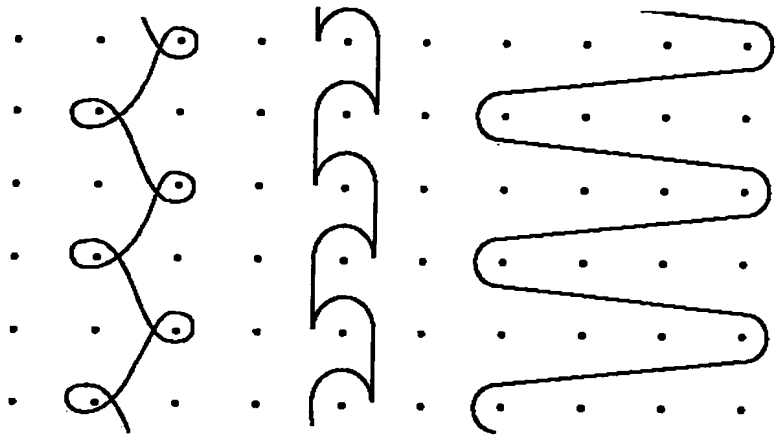
Knit construction

(Three dimensional)



(In laid yarn omitted)

Lapping movements



Knit sample of comparative (Similar to Comparative Example 1)

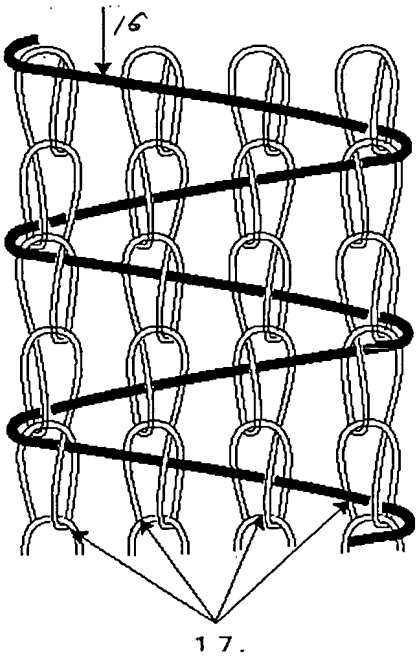
A Raschel warp knit fabric was knit by using a single Raschel warp knitting machine (9 gauge) having three guide bars (G1, G2 and G3) with a fall-plate under the following knitting conditions. The lapping movements of the guide bars during the knitting operation are shown below.

Guide bars	Threading	Chain link	Kind/Number of ends threaded
G1 (middle guide bar full-set for ground structure)		10/01.	F-multi (277.8 dtex/24f)/2
G2 (back guide bar full-set for inlaid yarn)		00/33	P-multi (277.8 dtex/24f)/1

The resultant grey fabric was heat-treated through a boiling water (at 100C) at a tension of 20g/10 cm width for about 5 seconds, dehydrated and dried. Physical properties of the finished fabric are as follows:

Basis of weight	20 g/m long × 10 cm width
Course density	12 courses/2.54 cm
Wale density	11.4 wales/2.54 cm
Elongation	17.7%
Elastic recovery of elongation	77%

Knit construction
(Three dimensional)



Lapping movements